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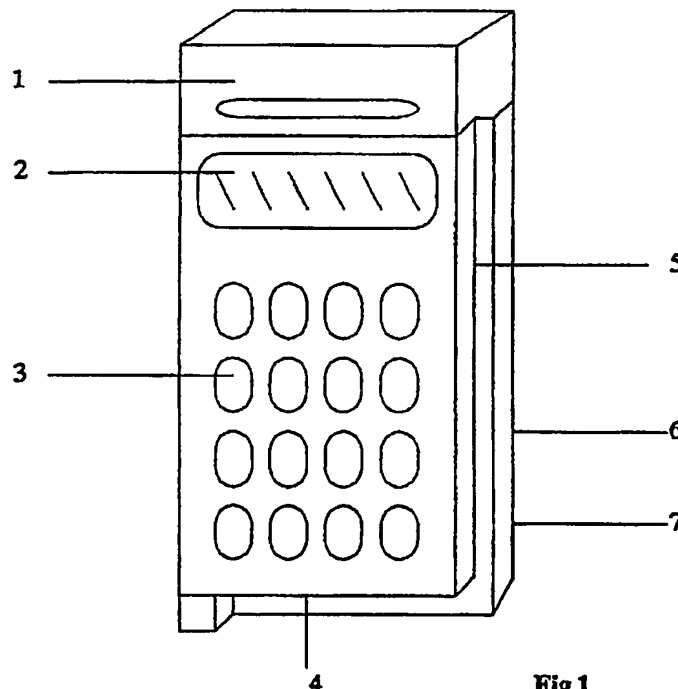
(52) UK CL (Edition M )  
G4A AUXF

(56) Documents Cited  
US 4511970 A US 3938090 A

(58) Field of Search  
UK CL (Edition L ) G4A ADT AKBX AUXF  
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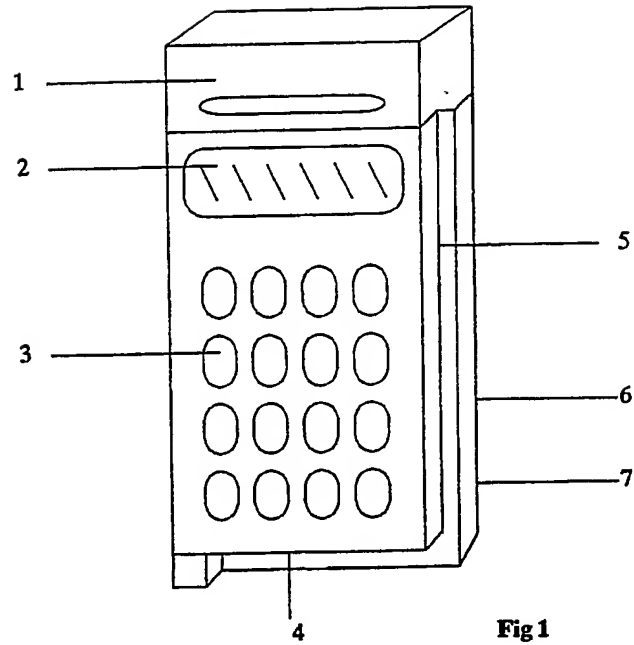
(54) **Portable electronic fund transfer device**

(57) A portable electronic fund transfer device, has a keypad 3 and display for the man-machine interface, a DTMF circuit and speaker 6 for the purpose of transmitting fund transfer data via a voice channel of a telephone, a portable secure integrated circuit interface 4 for specifying and controlling the payment application and authenticating and/or encyphering the fund transfer instruction data, optionally a magnetic swipe card interface for reading and writing to a magnetic payment card, optionally a printer to print payment receipts, and optionally a security module to authenticate the payment card. Payment data is authenticated in the device by one or more unique keys stored inside the portable secure integrated circuit module which is inserted into the device. This unique key changes after every successful data transfer, this change being based on the host acknowledgement message keyed into the device.

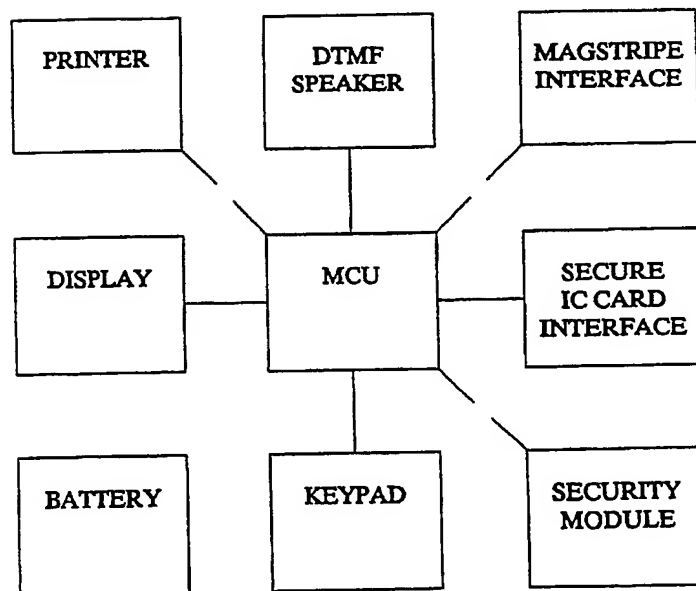


**Fig 1**

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**Fig 1**



**Fig 2**

Fig 3

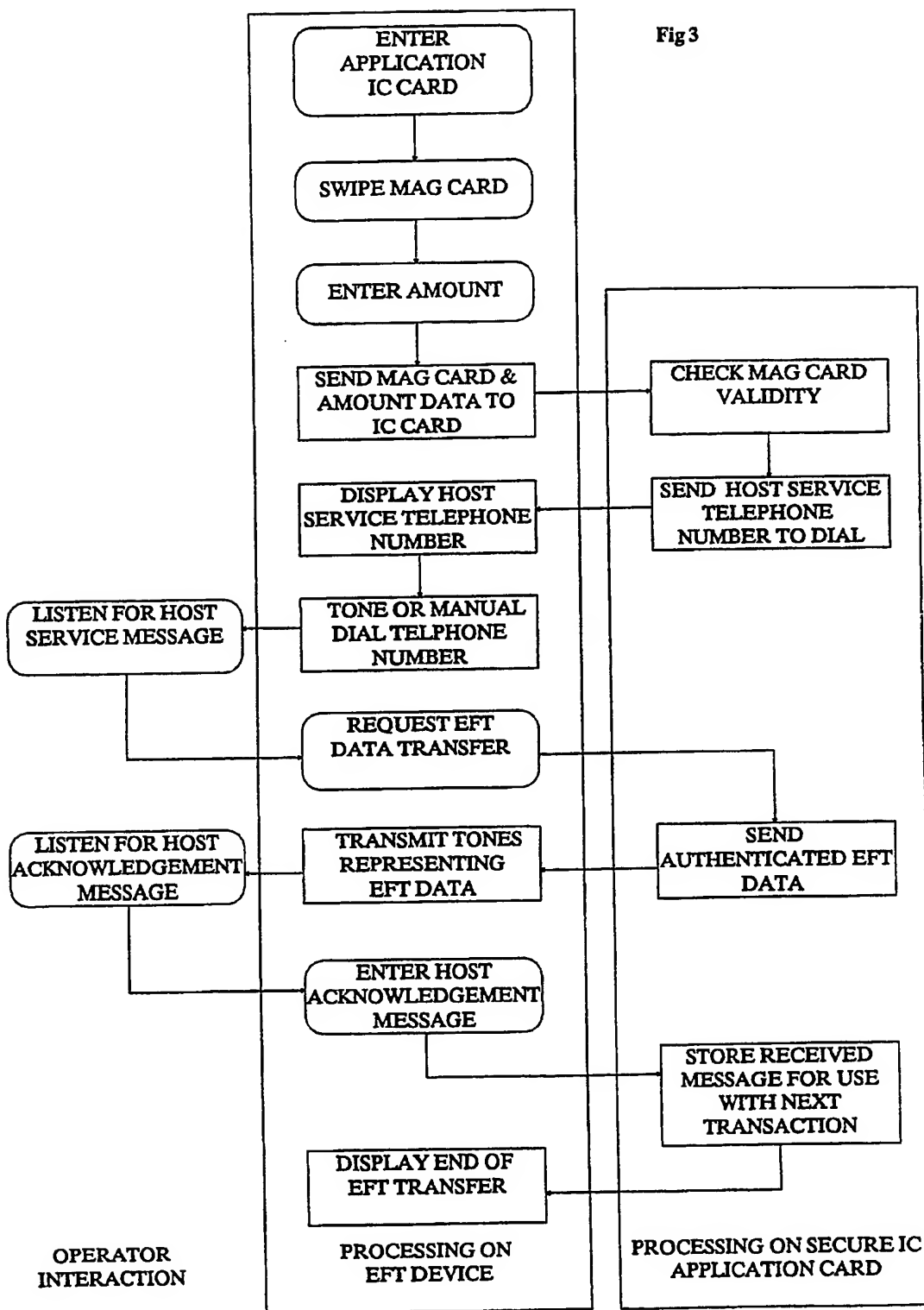
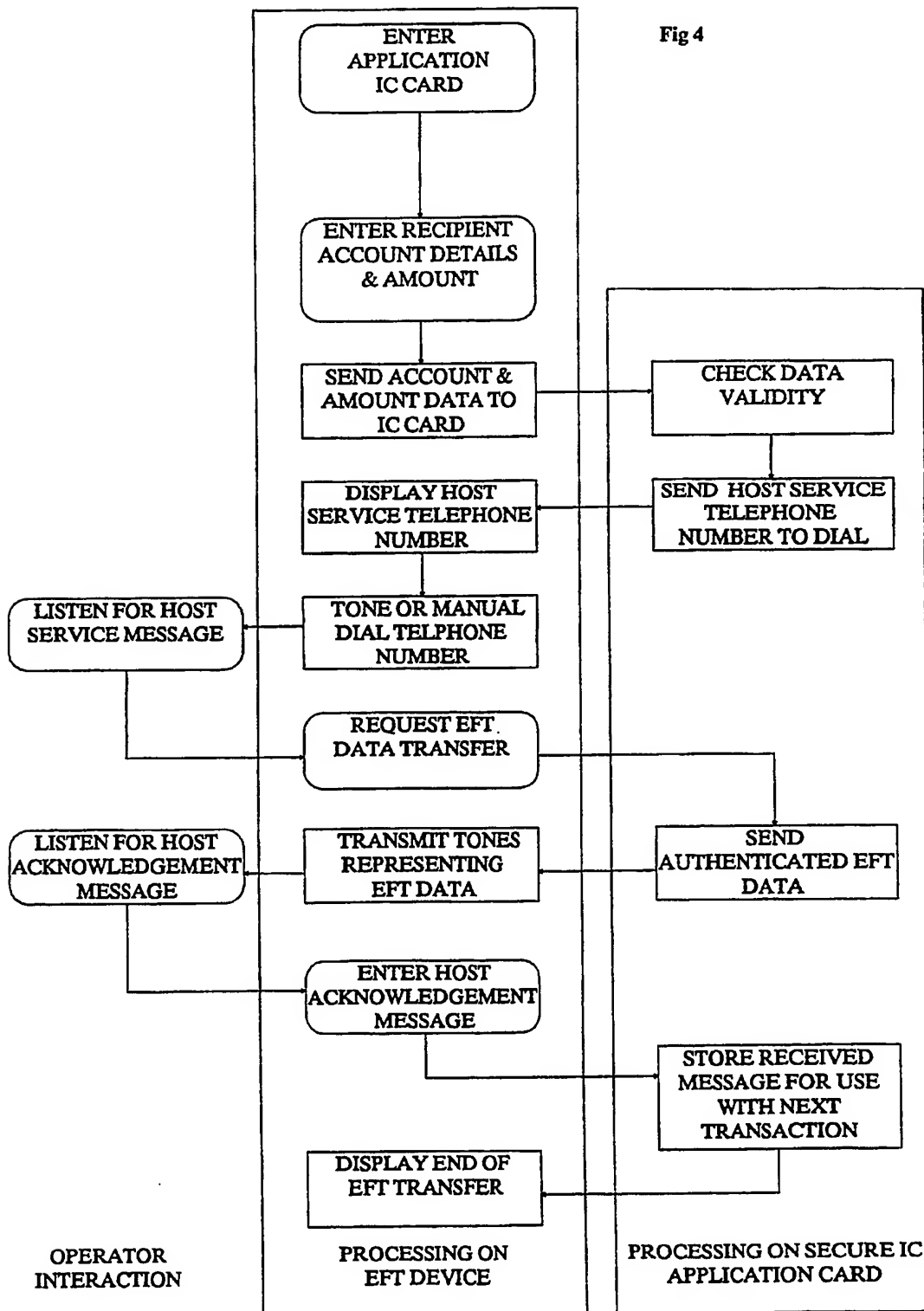


Fig 4



## PORTABLE ELECTRONIC FUND TRANSFER DEVICE

This invention relates to a portable electronic fund transfer device.

Electronic fund transfer devices are well known comprising read, and optionally write, interfaces to portable payment cards or tokens together with a communication mechanism for the transfer of fund transfer data to one or more data collection hosts. A special type of electronic fund transfer device known as an EFTPOS terminal is used in point of sale environments for the acceptance of payment cards with either real-time or subsequent batch transfer of payment data via telephone and/or X.25 links.

Electronic fund transfer devices are, however, relatively expensive. Moreover their use is limited to high volumes of electronic transaction transfers per day, and thus these devices have their uses limited to point of sale environments which accept payment cards or tokens at a regular frequency. Thus for point of sale outlets and private individuals wishing to make few and irregular fund transfer requests, the current devices provide a relatively expensive mechanism.

According to the present invention there is provided a portable electronic fund transfer device comprising a portable enclosure, a keypad, a display, the keypad and display being used to provide the man machine interface, a DTMF circuit and speaker being used to transfer low volumes of fund transfer data via the voice channel of a telephone link, an interface to a portable secure integrated circuit module, which can take any form such as a single chip integrated circuit card, the module being adopted to securely configure the device with the exact nature of the payment application in terms of both initialisation and payment data as well as program control, optionally a magnetic card interface to communicate with magnetic payment cards, optionally a printer to provide a paper record of any fund transfer instructions executed on the device, optionally an integral security module for secure data storage, and a microcontroller unit (MCU) controlling all the elements forming this device. Payment data is authenticated in the device by one or more unique keys inside the portable secure integrated circuit module with this unique key changing after every successful data transfer, this change being based on the host acknowledgement message keyed into the device, the DTMF speaker being used to broadcast this low volume of authenticated fund transfer data into the voice channel of a telephone link.

A specific embodiment of the invention will now be described by way of examples with reference to the accompanying drawing in which :-

Figure 1 shows in perspective, the electronic fund transfer device;

Figure 2 illustrates the block schematic diagram of the electronic fund transfer device;

Figure 3 illustrates the application flow diagram of the electronic fund transfer device used in point of sale application;

Figure 4 illustrates the application flow diagram of the electronic fund transfer device used as an electronic cheque payment terminal.

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Referring to the drawing figure 1 the portable battery operated electronic fund transfer device comprises an enclosure 7, a display 2, a keyboard 3, an interface for connecting to a portable secure integrated circuit module, a magnetic swipe card reader interface 5, a removable printer module 1, and a DTMF speaker 6 on the rear side of the device.

Inside the enclosure is an electronic circuit comprising a battery operated micro-controller unit (MCU) controlling all the elements namely the DTMF speaker, secure IC card or token interface, the keypad, the display, the optional magnetic stripe interface, printer and integral security module as illustrated in the block schematic diagram Fig 2.

A secure portable integrated circuit module inserted into interface 4 configures the standard electronic fund transfer device to specific applications such as EFTPOS for processing payment by magnetic swipe cards as described in Fig 3, or electronic cheque submissions as described in Fig 4. The fund transfer data is authenticated by the portable secure integrated circuit module using a unique key which changes after every successful data transfer, this change being based on the host acknowledgement message. The DTMF circuit and speaker is used to transfer low volumes of fund transfer data via the voice channel of a telephone link.

In the electronic fund transfer application described in Fig 3, a magnetic swipe payment card transaction is processed by a control dialogue between the MCU and the secure application integrated circuit (IC) card module. To perform a fund transfer request, insert the application IC card module into the device interface 4. A valid IC card module authenticates itself with the MCU by cyphering a random challenge from the MCU and transmitting the result back via interface 4 to the MCU for verification by the MCU itself or by an integral security module in the device. After correct validation of this application IC card, the operator can swipe a magnetic card through the interface 5 in order for the MCU to read the data stored on the magnetic swipe card. The operator is then prompted to enter the amount of the payment transfer. The MCU transmits the magnetic swipe card data and the amount to the IC card which checks the validity of the data which if valid initiates the transfer of the host service telephone number to the device from the IC card. The device displays this telephone number on the display 2 for manual dialing of the number or for automatic tone dialing via an operator activated key stroke after placement of the device DTMF speaker 6 in close proximity to the microphone of the telephone handset. After connection to the host service computer, an operator activated key stroke on the device, transfers the authenticated EFT data from the IC card to the DTMF speaker. The EFT data is thus transmitted to the host service computer via the voice channel of the telephone line. On valid reception of this data, the host computer transmits a host acknowledgement message in the form of a few digits which are heard by the operator and manually entered into the device using the keypad 3. This host acknowledgement message is transferred to the IC card for validation and storage. This host acknowledgement message is used in calculating the subsequent unique key used in the next funds transfer instruction to the host service computer. If the host acknowledgement message is valid the device displays successful end of EFT transfer and prints a receipt if the optional printer is attached to the device.

In the electronic fund transfer application described in Fig 4, an electronic cheque fund transfer transaction is processed by a control dialogue between the MCU and the secure application integrated circuit (IC) card module. The IC card itself has a valid payment service to make the fund transfer request. Thus the flow control of this application is the same as that described in Fig 3 except no magnetic swipe payment card is necessary.

## CLAIMS

- 1        A portable electronic fund transfer device comprising a portable enclosure, a keypad, a display, the keypad and display being used to provide the man machine interface, a DTMF circuit and speaker being used to transfer low volumes of fund transfer data via the voice channel of a telephone link, an interface to a portable secure integrated circuit module, which can take any form such as a single chip integrated circuit card, the module being adopted to securely configure the device with the exact nature of the payment application in terms of both initialisation and payment data as well as program control, optionally a magnetic card interface to communicate with magnetic payment cards, optionally a printer to provide a paper record of any fund transfer instructions executed on the device, optionally an integral security module for secure data storage, and a microcontroller unit (MCU) controlling all the elements forming this device. Payment data is authenticated in this device by one or more unique keys inside the portable secure integrated circuit module with these unique keys changing after every successful data transfer, this change being based on the host acknowledgement message keyed into the device, the DTMF speaker being used to broadcast this low volume of authenticated fund transfer data into the voice channel of a telephone link.
- 2        A portable electronic fund transfer device as claimed in Claim 1, wherein portable integrated circuit module interface(s) are provided to load specific payment applications into the device.
- 3        A portable electronic fund transfer device as claimed in Claim 1 or Claim 2 wherein the portable integrated circuit module when inserted into the device activates the device and provides access control to the payment application.
- 4        A portable electronic fund transfer device as claimed in any preceding claim, wherein the DTMF circuit and speaker are used to transmit the EFT data to one or more host service data collection systems via the voice channel of a telephone link.
- 5        A portable electronic fund transfer device as claimed in any preceding claim, wherein an integral security module can be used to authenticate the portable magnetic swipe payment card and/or integrated circuit card.
- 6        A portable electronic fund transfer device substantially as described herein with reference to Figure 1-4 of the accompanying drawing.



Patents Act 1977  
 Examiner's report to the Comptroller under  
 Section 17 (The Search Report)

Application number

GB 9301424.9

Relevant Technical fields

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(ii) Int Cl (Edition 5 ) G06F 15/30

Search Examiner

B G WESTERN

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Date of Search

15 MARCH 1993

Documents considered relevant following a search in respect of claims 1-6

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	US 3938090 A (BORISON ET AL) - see whole document	1,4
X	US 4511970 A (OKANO ET AL) - see whole document	1,4

Category	Identity of document and relevant passages 5.	Relevant to claim(s)

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